EXHIBIT B

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

ENTROPIC COMMUNICATIONS, LLC, Plaintiff v. CHARTER COMMUNICATIONS, INC., Defendant.	Civil Action No. 2:22-cv-00125-JRG

SUPPLEMENTAL EXPERT REPORT OF STEVEN H. GOLDBERG REGARDING INVALIDITY OF CLAIMS 3-6 OF U.S. PATENT NO. 8,792,008 AND ENTROPIC'S CONTENTIONS REGARDING OBJECTIVE INDICIA OF NONOBVIOUSNESS OF THE ASSERTED PATENTS

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I. INTRODUCTION

1. I submit this Supplemental Expert Report to set forth opinions I have formed, and may offer at trial of this action, regarding the invalidity of newly asserted claims 3-6 of U.S. Patent No. 8,792,008 (the "'008 Patent"). I incorporate by reference my opening expert report regarding invalidity, submitted on July 21, 2023 (my "Opening Invalidity Report").

2. It is my opinion that claims 3-6 of the '008 Patent are invalid for the reasons discussed below. This Supplemental Expert Report also provides my responses to Entropic's arguments concerning the objective indicia of nonobviousness of all six Patents-in-Suit, which I understand Entropic provided on or after the day Charter served my Opening Invalidity Report.[1]

II. ADDITIONAL MATERIALS CONSIDERED

3. In addition to the materials I considered in forming my opinions set forth in my Opening Invalidity Report, I have reviewed the additional materials listed in Exhibit 8.[2]

III. THE '008 PATENT

4. My Opening Invalidity Report contains an extensive discussion of the '008 Patent, including the background and summary of the alleged invention of the '008 Patent, the priority date / date of conception, and the relevant claim constructions. I incorporate my Opening Invalidity Report here by reference, as if repeated here in its entirety.

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[1] The "Patents-in-Suit" are U.S. Patent Nos. 8,223,775 (the "'775 Patent"), 8,284,690 (the "'690 Patent"), the '008 Patent, 9,210,362 (the "'362 Patent"), 9,825,826 (the "'826 Patent"), and 10,135,682 (the "'682 Patent").

[2] I have also attached as Exhibit 9 to this Supplemental Report a Declaration from the Internet Archive that further confirms the public availability of DOCSIS 2.0 Radio Frequency Interface Specification, Document Control No. CM-SP-RFIv2.0-I11-060602 (CHARTER_ENTROPIC00479650) at least as far back as July 28, 2007. *See* Opening Invalidity Report, ¶ 108. In my Opening Invalidity Report, I applied DOCSIS 2.0 to the asserted claims of the '690 and '826 Patents.

a. Additional Asserted Claims

5. I understand that Entropic accuses Charter of infringing claims 3-6 of the '008 Patent. I discuss below my opinions on the validity of these claims.

b. Invalidity of Claims 3-6 the '008 Patent Under 35 U.S.C. §§ 102 and 103

6. In my opinion, US 2007/0286311 A1 ("CHARTER_ENTROPIC00033947 – 00033957) ("Coyne") discloses or, at least in combination with US 5,874,992 ("CHARTER_ENTROPIC00033936 – 00033946") ("Caporizzo"), renders obvious claims 3-6 of the '008 Patent. I have described those references, and the reasons they constitute prior art, in my Opening Invalidity Report (which is incorporated by reference), and I will not repeat that information here.

i. Claim 3 Is Invalid in View of Coyne in Combination with Caporizzo.

1. 3[pre] A method comprising:

7. I understand that the preamble is not limiting and therefore should not be considered in assessing whether each limitation of claim 1 is taught by the prior art. To the extent the preamble is limiting, in my opinion Coyne discloses or renders obvious this clam limitation.

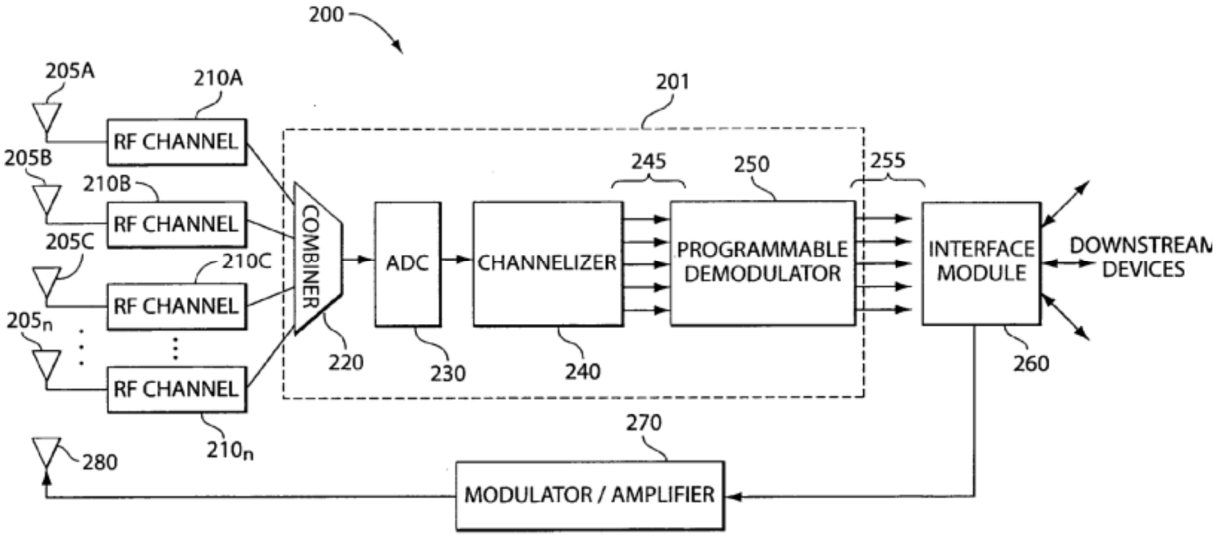
8. Coyne discloses "a communications system comprises an analog-to-digital converter,[3] a channelizer and at least one circuit." Coyne [¶ 0007]. Coyne further instructs that "the analog-to-digital converter receives an analog input signal and produces a digital representation of the analog input signal." *Id.* Coyne also teaches the use of a channelizer in the system that "receives the digital representation of the analog input signal and produces a plurality of digital output signals, each digital output signal representing a frequency band within a bandwidth of the analog input signal." *Id.*

[3] The analog-to-digital converter is often abbreviated "ADC."

9. Coyne further explains that the disclosed invention is a method as well as a system. For example, Coyne states that "[a]ccording to one aspect of the present invention, a method comprises acts of…" Coyne [¶ 0006]. Claims 1-12 of Coyne are also directed to methods.

2. 3[a] performing by one or more circuits: receiving a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;

10. Coyne discloses this limitation. Figure 2 of Coyne provides a helpful schematic to orient a person of ordinary skill in the art (POSITA):



11. Coyne teaches that a device called the "combiner" (element 220) combines incoming radio frequency signals (Elements 210A through 210_n), which are analog signals, to a wide-band or ultra-wideband spectral space, and outputs them to an analog-to-digital converter. *Id.* [¶¶ 0020-22]. The wideband signal can be, *e.g.*, up to 512 MHz, the ultra-wideband signal can be, *e.g.*, up to 2 Ghz, and the incoming signal will contain a plurality of channels. *Id.* [¶ 0017]. The received "RF Channel[s]" are depicted in Figure 2 itself. The analog-to-digital converter provides "a digital representation of the combined signal" to the channelizer, which converts (*i.e.*, "de-multiplexes") that digital signal into one or more channel outputs. *Id.* [¶ 0022].

12. Per Coyne, "[i]f channelizer 240 is used to generate multiple channel outputs, each may span a [sic] any desired portion of the entire frequency spectrum of interest." *Id.* [¶ 0031]. Coyne also discloses that this channelizer has a "filter bank" in which each filter possesses a passband spanning some portion of the frequency spectrum of interest. *Id.* [¶ 0004]. Coyne instructs that "[t]he passbands of all filters span the complete spectrum of interest." *Id.*

13. Although Coyne does not explicitly use the terms "F_{lo} and F_{hi}," a POSITA would understand that these are simply the variables reflecting the minimum and maximum frequencies by which the wideband or ultra-wideband signal, or spectrum of interest, is bounded. In particular, the limitation of "receiving a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, is disclosed in substantively the same manner in both the '008 Patent and Coyne. *Compare* '008 Patent at 6:21-27 ("the receiver circuit 100 may receive a frequency division multiplexed (FDM) signal comprising one or more channels (*e.g.*, satellite television channels, cable television channels, and/or DOCSIS channels) occupying a frequency band between F_{lo} and F_{ii}.") *with* Coyne [¶¶ 0021-22] ("In the example shown, receiver/adapter 201 includes combiner 220, which receives incoming radio frequency (RF) signals 210A-210n from antennae 205A-205*n*. Combiner 220 combines these signals to a wide band or ultra-wideband spectral space, and provides output to analog-to-digital converter (ADC) 230. ADC 230 provides a digital representation of the combined signal to channelizer 240, which de-multiplexes that digital signal into one or more channel outputs 245.").

14. Coyne also teaches that this step is performed "by one or more circuits." For example, Coyne teaches "a communications system comprises an analog-to-digital converter, a channelizer and at least one circuit." Coyne [¶ 0007]. In addition, it is my understanding that Charter's claim construction expert, Dr. Kevin Almeroth, cited the following dictionary definition for "circuit" as

noted by the Court in its Claim Construction Order when construing that term in the asserted U.S. Patent No. 8,223,775 (the "'775 Patent"):

> 1. Any path that can carry electrical current. 2. A combination of electrical components interconnected to perform a particular task. At one level, a computer consists of a single circuit; at another, it consists of hundreds of interconnected circuits.

Claim Construction Memorandum Opinion and Order, Dkt. 123 at 10-11 (June 26, 2023) ("CC Order") (quoting Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl., App'x C, Microsoft Computer Dictionary 99 (5th ed. 2002)). Entropic argued that this definition means that a "circuit" is simply any "combination of electrical components interconnected to perform a particular task." The Court agreed with Entropic and found that "consistent with Plaintiff's interpretation that the phrases 'first circuit' and 'second circuit' are not limited to specific established structures but rather refer to interconnected electrical components that implement the data networking engine functionality and the cable modem engine functionality." *Id.* at 11. As such, by definition, whichever components perform the steps recited in 3[a] are performed "by one or more circuits."

3. [3b] digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal;

15. For the reasons stated immediately above in Section III.b.i.2, a POSITA would understand that the ADC from Coyne digitizes the received signal from F_{lo} to F_{hi}. By way of example, Coyne states "Combiner 220 combines these signals to a wide band or ultra-wideband spectral space and provides output to analog-to-digital converter (ADC) 230. ***ADC 230 provides a digital representation of the combined signal to channelizer 240***, which de-multiplexes that digital signal into one or more channel outputs 245." Coyne [¶ 0022] (emphasis mine)[4]; *see also id.* [¶ 0029] ("Combiner 220 provides signal output to ADC 230, which converts the composite signal from

[4] All emphases are added unless noted otherwise.

analog to digital form."), [¶ 0030] ("ADC 230 provides digital output to channelizer 240, which de-multiplexes the output in the digital domain to produce, as an example, multiple channel outputs."). Coyne further states that the "analog-to-digital converter receives an analog input signal ***and produces a digital representation of the analog input signal.***" *Id.* [¶ 0007].

4. [3c] selecting a first portion of said digitized signal;

16. Coyne teaches that the channelizer may "generate multiple channel outputs" which it may determine "using any a priori knowledge." *Id.* [¶¶ 0030-31]. Coyne also teaches that "[i]n some embodiments, channelizer 240 de-multiplexes the output of ADC 230 to separate it into different communication sets, such as voice data, video, data streams, other information, or a combination thereof." *Id.*

17. Coyne further discloses that if the channelizer is used to generate multiple channel outputs, "each may span a [sic] any desired portion of the entire frequency spectrum of interest. For example, a 512 MHz frequency spectrum of interest may be divided into four 128 MHZ channels, eight 64 MHZ channels, five hundred twelve 1 MHZ channels, or any other desired number of portions. Of course, each portion need not span the same percentage of the entire frequency spectrum of interest. For example, a 512 MHz frequency spectrum of interest might be divided into one 256 MHZ channel and four 64 MHZ channels." *Id.* [¶ 0031].

18. Coyne further teaches that "[a]ccording to one aspect of the present invention, a method comprises acts of: (A) providing a channelizer which receives a digital representation of an analog input signal and ***produces a plurality of digital output signals***, each digital output signal representing a frequency band within a bandwidth of the analog input signal; (B) during at least one first time period, ***demodulating at least one digital output signal produced by the channelizer to extract communications data*** from the at least one digital output signal; and (C) during at least one second time period, ***processing at least one digital output signal produced by the channelizer***

for a purpose other than extracting communications data from the at least one digital output signal." *Id.* [¶ 0006].

19. Therefore, a POSITA would readily understand that the channelizer is able to select multiple portions of a digital signal, including the claimed "first portion" of the signal.

5. [3d] selecting a second portion of said digitized signal; and

20. For the reasons stated immediately above in Section III.b.i.4, a POSITA would understand that the channelizer is able to select multiple portions of a digital signal, including the claimed "second portion" of the signal.

6. [3e1] concurrently outputting said selected first portion and said selected second portion, wherein: said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal;

21. Coyne teaches that after the analog signal has been digitized, "a programmable demodulator is employed to process channel output(s) of a receiver to extract communications data therefrom." *Id.* [¶ 0018]. Coyne also discloses the extraction of communications data (such as a "voice data, video, . . . or a combination thereof.") *Id.* [¶ 0030].

22. The '008 Patent states that the "monitoring module 154 may be operable to analyze the band . . . to measure/determine characteristics such as . . . type and/or amount of modulation." '008 Patent at 3:33-37.

23. The programmable demodulator of Coyne may extract communications data using "any of numerous components . . . . For example, programmable demodulator 250 may comprise one or more field programmable gate arrays (FPGAs), application specific integrated circuits (ASICs), cell processors, programmed procedures executing on a Multi-Processor or Multi-Core PowerPC or other high performance processor(s), other component(s), or a combination thereof." Coyne [¶ 0032].

24. Coyne teaches that the programmable demodulator "may be capable of applying different demodulation algorithms to different channel outputs of channelizer 240. For example, programmable demodulator 250 may apply a Quadrature Phase Shift Keying (QPSK) demodulation algorithm to a first channel output, a Frequency Shift Keying (FSK) demodulation algorithm to a second channel output, another demodulation algorithm to another channel output, and so on." *Id.* [¶ 0033]. The '008 Patent teaches the "determine characteristics such as . . . type and/or amount of modulation" step. '008 Patent at 3:35-40. A POSITA would understand that "applying different demodulation algorithms" discloses the "determine one or more characteristics such as…. The type or/amount of modulation" step required by this limitation. *Compare* Coyne [¶ 0033] *with* '008 Patent at 3:35-40. A POSITA would understand that in order for a demodulator to successfully function it would need to determine signal and/or modulation level and determine the modulation symbols received based on the type of modulation present.

25. A POSITA would understand that Coyne's programmable demodulator acts as a signal analyzer. It would be impossible for the programmable demodulator to perform the above-referenced functionality without measuring "a characteristic of [the] digitized signal." A POSITA would readily understand such functionality would be necessary for the system to be operable.

26. Coyne also discloses that the programmable demodulator may determine the Doppler frequency shift of the channel output generated by the channelizer. Per Coyne:

> In one example, programmable demodulator 250 may execute one or more programmed procedures to compensate for Doppler frequency shift, which can occur when a signal is received on a mobile platform from a transmitter which is moving with respect to the mobile platform. For example, a signal received by a first airplane from a second airplane that is moving toward the first airplane at a supersonic speed may shift, for example, up to 4 MHZ, and can cause a receiver on the first airplane tuned to a specific channel to lose the signal. Accordingly, in some embodiments, programmable demodulator 250 may process channel output of channelizer 240 to detect and/or compensate for Doppler frequency shift. For example, if a transmission received on a mobile platform at a particular frequency

> (e.g., in a particular channel output of channelizer 240) from another mobile platform is lost, programmable demodulator 250 may execute programmed logic to examine the output of channelizer 240 residing in one or more channels nearby the channel in which the signal had previously been received. If a signal is detected in one or more of the nearby channels, programmable demodulator 250 may compensate for the shift.

Id. [¶ 0036]; *see also id.* [¶ 0037] ("In examining channel output to determine whether Doppler frequency shift has occurred, programmable demodulator 250 may employ information provided by, for example, one or more system(s) on board a mobile platform. This information may indicate, for example, to what extent the frequency of the signal may have shifted. For example, it is known that there is a positive correlation between the extent of a Doppler frequency shift, the speed of the receiving platform, the speed of the transmitting platform, and the platforms relative direction . . . ."), [¶ 0038] ("Of course, compensating for Doppler frequency shift need not be performed using the exemplary techniques described above, and may be accomplished in any of numerous ways.").

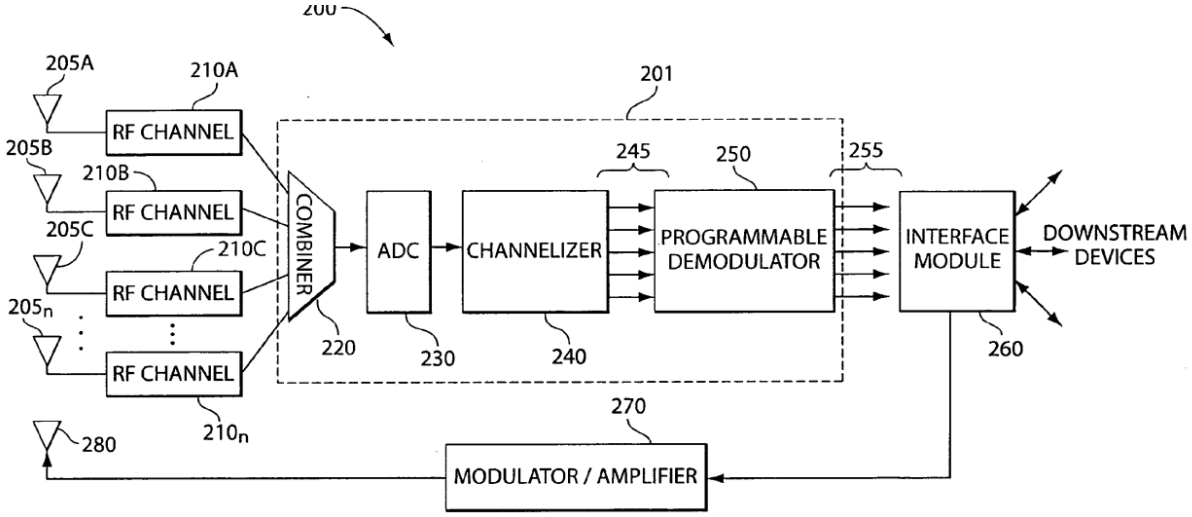
27. Coyne also explains that any type of characteristic can be determined and used by the invention, which is not limited to Doppler frequency shift. For example, Coyne states: "[i]n addition, embodiments of the invention may additionally or alternatively perform one or more other types of logical processing that are unrelated to detecting and/or compensating for Doppler frequency shift, as the invention is not limited in this respect," *id.* [¶ 0038]; "[a] demodulator may additionally or alternatively perform any of numerous types of logical processing on channel output(s) not associated with demodulation," *id.* [¶ 0019]; and "during at least one second time period, processing at least one digital output signal produced by the channelizer for a purpose other than extracting communications data from the at least one digital output signal," *id.* [¶ 0006].

28. A POSITA would further understand that each portion of the signal may be outputted serially or "concurrently" in parallel. In particular, Coyne teaches that the "ADC 230 may generate

a parallel bit stream representing the signal, although the invention is not limited to such an implementation. One or more serial bit streams may additionally or alternatively be provided." *Id.* [¶ 0029]. Coyne does not indicate that the channelizer converts the bit stream from parallel back to serial, and so a POSITA would understand that Coyne inherently teaches that signals are sent to the programmable demodulator in parallel (*i.e.*, "concurrently.").

29. I note in this regard that, in the '008 Patent, there is no disclosure whatsoever, inherent or otherwise, of the claimed "concurrently outputting."

30. The output from the channelizer to the programmable demodulator is depicted in Coyne Figure 2 as element 245:



7. [3e2] and which reports said determined one or more characteristics to a source of said received signal;

31. Coyne does not explicitly state that the receiver reports the characteristic back to the "source of said received signal." However, Coyne does teach that the results of channel processing (*e.g.*, characteristic determination and/or processing of same) can be transmitted "to a communications interface module for delivery to one or more downstream devices." Coyne [¶ 0013]. In addition, Coyne teaches transmission of information upstream with antenna 280. *See*

id. [¶ 0040]. A source of the received signal would be the most obvious upstream destination for such determined characteristic.

32. Moreover, Caporizzo expressly teaches this. It teaches a "CATV transmission network 5 [that] begins with a plurality of coaxial or fiber optic trunk lines 40 coupled to the headend 15. Some portions of the CATV plant may use fiber optic cables instead of coaxial transmission cables." Caporizzo at 2:46-49.

33. Caporizzo instructs that "the data to be monitored by the preferred embodiment of the present invention is embedded at the headend 15 within the Vertical Blanking Interval ("VBI") of a television signal. As is well known to those skilled in the art, the VBI may include special reference signals that are located on various lines of the VBI. Several common signals include the vertical interval test signal VITS), vertical interval reference signal (VIRS), and the close caption signal (CC)." Caporizzo at 4:30-38.

34. Caporizzo further instructs that "[a]s data [from these VBI signals] is received by the microprocessor 138, the total number of received bytes are counted by a first counter 148. The microprocessor 138 then determines whether or not the received bit of data contains an error." Caporizzo at 4:41-45. "When the bit error rate exceeds a predetermined threshold the settop terminal generates a warning signal for transmission to the headend, which diagnoses the problem." Caporizzo at 2:1-2:3. The return of warning signal to the headend constitutes a network management message returned to the source of the received signal, and is equivalent to the disclosure in the '008 Patent that: "such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels ***are outside acceptable bounds*** . . . ." '008 Patent at 3:51-55.

35. Caporizzo also teaches that the determined characteristic itself can be reported to the source of the received signal. *See* Caporizzo at 5:30-3 ("Once the process has been initiated (Step 400) the microprocessor 138 retrieves from memory 160 the values accumulated for total bytes and bytes with errors (step 401). The microprocessor 138 then performs the BER calculation (step 402). In the preferred embodiment, this calculation is a simple algorithm comprising dividing the bytes with errors by the total number of bytes. This value may be stored in memory 160 or forwarded to the headend 15 via an RF return transmitter 140, if so equipped.").

36. In my opinion, a POSITA would be highly motivated to combine Coyne with Caporizzo. Caporizzo discloses a method for reducing the number of technician visits to a subscriber, or "truck rolls" that a cable provider needs to make to diagnose problems in an HFC network. Caporizzo identifies this as a known problem in the art, *id.* at 1:33-41 ("[a]lthough a technician may be dispatched to the subscriber's household, the problem may not originate with that particular subscriber's settop terminal. On the contrary, an entire portion of the CATV system may be inoperable. Accordingly, it is difficult for CATV network operators to effectively monitor the operation of the system and to quickly determine the location of problems in order to prevent system-wide failure.").

37. My opinion on the obviousness of this limitation, and claim 3 in general, is confirmed by the prosecution history of U.S. Patent No. 9,825,826 (the '826 Patent), which claims priority to and shares a common specification with the '008 Patent. During prosecution of the application that issued as the '826 Patent, the Examiner (who also examined the '008 Patent) issued a Nonfinal Office Action that rejected all pending claims on the grounds of obviousness over the prior art (among other grounds). *See* CHARTER_ENTROPIC_0000745 at 852-862. In addressing claim 1 of that application, the Examiner stated "it is well known in the art of television/video/audio

broadcast to transmit, send, or transfer characteristics of a signal being received and processed back to the controller, which may be a server computer/controller, or the headend for the purpose of generating further adjustment and/or instructions based on such feedback." *Id.* at 856; *see also id.* at 860 (stating that the foregoing steps would have been "obvious"). The Examiner thus understood, as I do, that it was "well known" and "obvious" to send characteristics of a received signal back to the source of the signal.

8. [3e3] and said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.

38. Coyne teaches that the channelizer may de-multiplex the output of the analog-to-digital converter to produce "multiple channel outputs," which may include different communication sets such as voice data, video data, and so on. *Id.* [¶ 0030]. The communications data from these outputs are extracted by the programmable demodulator, which incorporates a data processor. *Id.* [¶ 0032]. Specifically, Coyne states that the "programmable demodulator 250 may comprise one or more field programmable gate arrays (FPGAs), application specific integrated circuits (ASICs), cell processors, programmed procedures executing on a Multi-Processor or Multi-Core PowerPC or other high performance processor(s), other component(s), or a combination thereof." *Id.*

39. Coyne further teaches that "[a]ccording to one aspect of the present invention, a method comprises acts of: (A) providing a channelizer which receives a digital representation of an analog input signal and produces a plurality of digital output signals, each digital output signal representing a frequency band within a bandwidth of the analog input signal; (B) during at least one first time period, ***demodulating at least one digital output signal produced by the channelizer to extract communications data*** from the at least one digital output signal; and (C) during at least one second time period, ***processing at least one digital output signal produced by the channelizer***

for a purpose other than extracting communications data from the at least one digital output signal." [¶ 0006].

40. Coyne teaches that the programmable demodulator not only operates as a signal analyzer, as set forth in Section III.b.i.6, it also acts as the claimed data processor to recover data carried on one or more of the channels.

ii. Claim 4 Is Invalid in View of Coyne in combination with Caporizzo.

1. [4] The method of claim 3, wherein said first portion comprises all of said received signal from F_{lo} to F_{hi}.

41. As I discussed above, Coyne in combination with Caporizzo would have rendered claim 3 obvious. *See* Section III.b.i.

42. Coyne teaches that the channelizer may output to the programmable demodulator "multiple channel outputs, each may span a [sic] any desired portion of the entire frequency spectrum of interest." Coyne [¶ 0031] ("For example, a 512 MHz frequency spectrum of interest may be divided into four 128 MHZ channels, eight 64 MHZ channels, five hundred twelve 1 MHZ channels, or any other desired number of portions. Of course, each portion need not span the same percentage of the entire frequency spectrum of interest. For example, a 512 MHz frequency spectrum of interest might be divided into one 256 MHZ channel and four 64 MHZ channels. The number of channels and bandwidth of each channel may be chosen, for example, based on the application for which system 200 is employed."). "Any desired portion" includes the entire frequency spectrum of interest.

43. As mentioned above in Section III.b.i.6, the programmable demodulator acts as the signal analyzer. Coyne discloses that the programmable demodulator processes "at least one digital output signal produced by the channelizer for a purpose other than extracting communications data from the at least one digital output signal." *Id.* [¶ 0006]. This is the signal analyzing function. "At

least one digital output signal" includes all digital output signals, and also includes any one or more digital output signals that span the entire frequency spectrum of interest.

44. As such, Coyne discloses that the claimed "first portion" (the portion which is output to the signal analyzer) spans the entire frequency spectrum of interest, from F_{lo} to F_{hi}.

iii. Claim 5 Is Invalid in View of Coyne in Combination with Caporizzo.

1. [5] The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

45. For the reasons I stated above in Section III.b.i.7, a POSITA would be motivated to combine Coyne with Caporizzo.

46. Caporizzo discloses that one of the determined characteristics may be the bit error rate:

> The settop terminal 10 calculates the bit error rate (BER) using the procedure shown in the flow diagram of FIG. 5. As with the BER data accumulation, the BER calculation procedure may be initiated (step 400) on demand by the headend 15, on demand by the subscriber via the settop terminal 10, or periodically by either the headend 15 or the settop terminal 10. Once the process has been initiated (Step 400) the microprocessor 138 retrieves from memory 160 the values accumulated for total bytes and bytes with errors (step 401). The microprocessor 138 then performs the BER calculation (step 402). In the preferred embodiment, this calculation is a simple algorithm comprising dividing the bytes with errors by the total number of bytes. This value may be stored in memory 160 or forwarded to the headend 15 via an RF return transmitter 140, if so equipped.

Caporizzo at 5:24-38.

47. It is my understanding that when a claim limitation calls for the selection of one member from a closed group, a prior art reference that discloses at least one member of that group satisfies the limitation, even if it does not disclose other members of the group. As Caporizzo discloses that the determined characteristic may be the bit error rate, it discloses this limitation or renders it obvious.

48. As explained above, Coyne discloses that the disclosed system and method can be used to determine any type of signal characteristic; Coyne [¶¶ 0006, 0019, 0036-38]. Signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate were all well-known as of the priority date of Coyne.

iv. Claim 6 Is Invalid in View of Coyne in Combination with Caporizzo.

1. [6] The method of claim 3, wherein: said received signal is a cable television signal; and said plurality of channels comprises a plurality of television channels.

49. As I discussed above, Coyne in combination with Caporizzo would have rendered claim 3 obvious. *See* Section III.b.i. A POSITA would further understand that the received signal may also be a cable television signal, and the plurality of channels may comprise a plurality of television channels. As I explained in my Opening Invalidity Report, Section XI.e.i.2, a POSITA would understand that Coyne discloses that the received signals span the entire television spectrum and can include television signals. *See* Opening Invalidity Report ¶¶ 253-255; Coyne [¶¶ 0004, 0031].

50. Coyne also says that the disclosed system and method can be used in any setting, including in "any setting in which a system adapted to perform both signal detection and communications functions is useful, such as for commercial and/or civilian uses. The invention is not limited to being implemented in any particular setting." Coyne [¶ 0016]. Coyne specifically discloses uses for "voice data, video, data streams, other information, or a combination thereof." *Id.* [¶ 0030].

51. Coyne further states that "Combiner 220 may receive input signals provided in any suitable form ***and comprising any suitable information, as the invention is not limited to any particular implementation***. For example, RF channel input 210A may comprise a radio signal, and RF channel inputs 210B-210C may comprise a wideband digital stream including a satellite image, intelligence information, programmed instructions, other information, or a combination thereof (e.g., received by one or more antennae installed on a military vehicle)" *Id.* [¶ 0023].

52. Coyne further states that "[i]t should be appreciated from the foregoing description that embodiments of the invention may extend and generalize the capabilities of a channelized receiver to provide a user-configurable communications adapter that may be employed for any of numerous applications. For example, in enabling broadband capability, embodiments of the invention may provide a broad spectral space into which any number of incoming signals, each carrying any form of information, may simultaneously be multiplexed. This spectral space may be channelized into any desired number of channel outputs, each comprising any desired portion of the entire frequency spectrum of interest. Programmable components may optionally be provided for extracting data from the channel output(s), such that each output may be processed in any desired manner, to suit any desired application." *Id.* [¶ 0041]

53. Television is simply one known environment in which the system and method of Coyne may be utilized. In fact, with its disclosure of "voice data, video, data streams, other information, or a combination," as well as "broadband," Coyne specifically suggests such use. Caporizzo, which issued several years before Coyne was filed, discloses that the received signal is a cable television signal and that the channels may be television channels. *See, e.g.* Caporizzo at 2:35-39 ("The network 5 distributes cable television signals originating at the headend 15 to a plurality of Subscribers and transmits return messages from each subscriber settop terminal 10 which are received at the headend 15."). Caporizzo also describes the transmission of a "plurality of television channels." *Id.* at 3:4-6 ("Subscribers are typically authorized access to Specific CATV[5] channels by Subscribing to and paying for CATV Services."); 5:54-63 ("The central processor 71 may also instruct the settop terminal 10 to determine the BER on selected CATV channels

[5] "CATV" as used by Caporizzo refers to "cable television." *Id.* at 1:17.

whenever the subscriber terminal is not turned ON. Accordingly, the BER of every channel may be monitored by the CATV network operator daily, hourly or even more frequently. As a result, BER data may be collected for every channel and at every time during the day. The accumulated data provides the CATV network operator with an invaluable diagnostic tool for detecting and preventing CATV network problems."); 5:67-6:4 ("The CATV network operator, determining that certain portions of the Spectrum are more Susceptible to external RF interference, thus causing higher BERS than other portions of the Spectrum, may reassign CATV channels to other portions of the Spectrum."); *see also* Opening Invalidity Report ¶ 246 ("Narita discloses a "television broadcast receiver" that "determines the signal strength, the desired to undesired (D/U) ratio, [and] the carrier to noise (C/N) ratio of a received television signal.").

c. Subject Matter Eligibility

54. I have been asked to provide my opinion on the subject matter eligibility of claims 3-6 of the '008 Patent. In my opinion, these claims are invalid because they are directed to an abstract idea and do not recite an inventive concept. I provide my opinions below with respect to independent claim 3 as being representative of claims 3-6 of the '008 Patent.[6] It is my opinion that each of claims 4-6 is directed to the same abstract idea as claim 3, and none of these claims adds an inventive concept that addresses the shortcomings of claim 3.

55. In my view, claims 3-6 of '008 Patent are directed to unpatentable subject matter because, in essence, they recite no more than the abstract idea of recovering data in a received signal, determining some characteristic of the received signal, and reporting that characteristic back to the source of the signal.

[6] I also incorporate herein by reference my opinions on subject matter eligibility of the asserted claims of the '008 and '826 Patents set forth in my Opening Invalidity Report at paragraphs 332 to 346.

56. As I discuss in my Opening Invalidity Report, the specification of the '008 Patent does not disclose how the systems and methods claimed by the patent are in any way novel or an improvement over conventional techniques for monitoring network parameters. *See* '008 Patent at 1:34-45. In my opinion, this also applies to claims 3-6. Indeed, the specification does not even disclose what those conventional monitoring techniques are.

57. Here, representative claim 3 recites generic and functional steps that involve nothing more than the manipulation of data. Claim 3 recites:

> A method comprising:
>
> performing by one or more circuits:
>
> > ***receiving*** a signal having a bandwidth that spans from a first frequency, F_{lo}, to a second frequency, F_{hi}, wherein said signal carries a plurality of channels;
> >
> > ***digitizing said received signal*** from F_{lo} to F_{hi} to generate a digitized signal;
> >
> > ***selecting*** a first portion of said digitized signal;
> >
> > ***selecting*** a second portion of said digitized signal; and
> >
> > ***concurrently outputting*** said selected first portion and said selected second portion, wherein:
> >
> > said selected first portion is output to ***a signal analyzer which analyzes said selected first portion*** to ***determine one or more characteristics*** of the received signal, and which ***reports said determined one or more characteristics to a source*** of said received signal; and
> >
> > said ***selected second portion is output to a data processor*** for recovery of data carried on one or more of said plurality of channels.

The claim, as written, does not specify ***how*** the steps of "receiving," "digitizing," "selecting," "analyzing," "determining," or "outputting" are performed. Rather, like claims 1 and 2, as well as

claims 1-4 and 6-9 of the '826 Patent, claims 3-6 of the '008 Patent are recited at a high level of generality and fail to give any indication of how the method provides an improvement in the functionality of any network, system, or device. The specification does not include any disclosure of what problem these steps from the '008 Patent even aim to solve.

58. There is no inventive concept that transforms the abstract idea to which claim 3 is directed into something new or innovative. The high-level and generic components recited in claim 3, such as "circuits," a "signal analyzer," and a "data processor" are all well understood, routine, and conventional. The claims do not recite anything new or innovative concerning how these components are implemented or combined—the claims simply recite the well-known functions that a POSITA would have understood that these components perform.

59. Further, the high level steps of receiving a signal that carries a plurality of channels, digitizing the signal, outputting portions of the signal, recovering content from the received signal and measuring/ reporting a signal characteristic were all well understood, routine, and conventional at the time of, and well before, the alleged priority date of the '008 Patent, as demonstrated by the prior art cited in this supplemental report, my Opening Invalidity Report, and in Charter's initial and supplemental invalidity contentions.

60. Similarly, the features recited in dependent claims 4-6 also fail to transform the abstract idea recited in claim 3 into something a patentable invention. Claim 4 merely provides that that the "first portion" that is analyzed corresponds identically with all of the received signal, which does not add an inventive concept to the abstract idea. Similarly, claim 5 simply lists a number of well-known and conventional signal characteristics to be measured and reported. Claim 6 limits the received signal to a cable television signal and the channels carried in that cable television signal to television channels, which add nothing to the abstract idea recited in claims 3.

61. Simply put, in my opinion, newly asserted claims 3-6 of the '008 Patent are invalid for being directed to ineligible and unpatentable subject matter without any inventive concept.

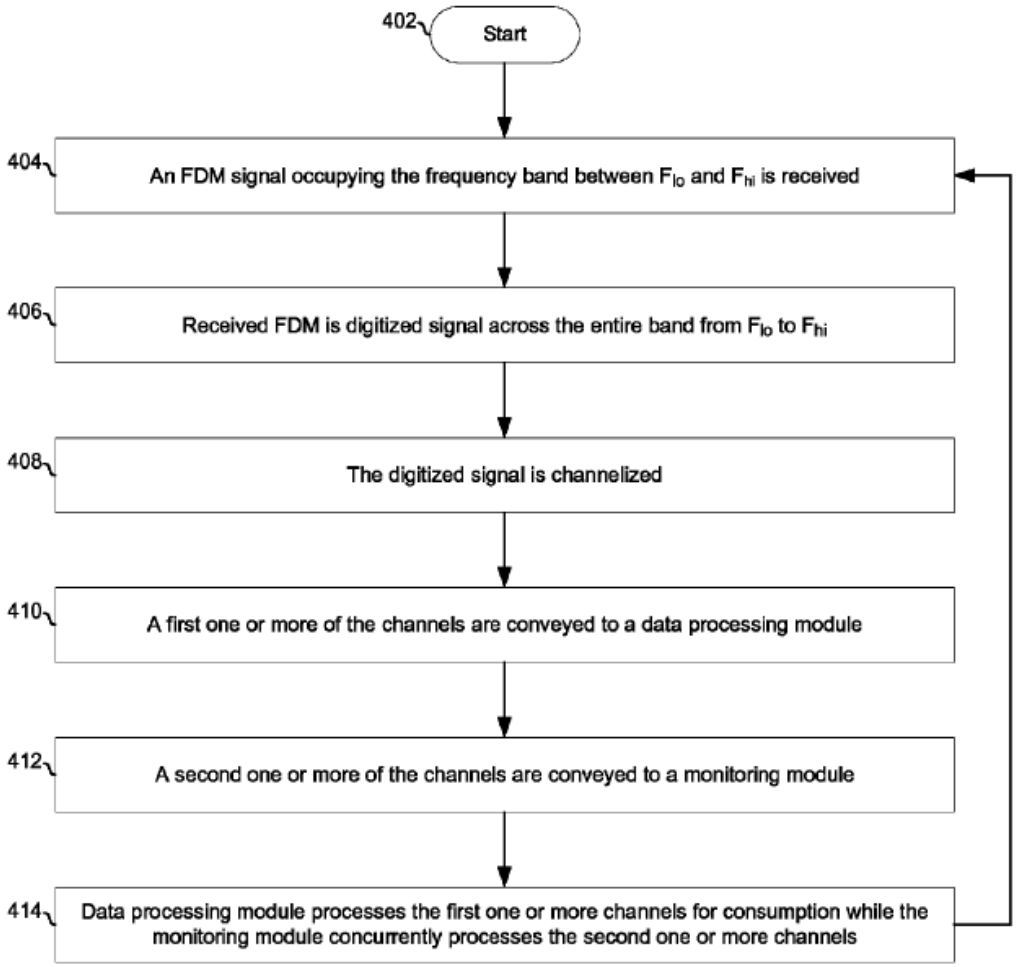
d. Invalidity Under 35 U.S.C. § 112

62. For the reasons set forth below, it is my opinion that claims 3-6 of the '008 Patent are invalid for lack of enablement and written description.

i. "concurrently outputting said selected first portion and said selected second portion …" (Claim 3)

63. Independent claim 3 recites the step of "concurrently outputting said selected first portion and said selected second portion…" where the selected first portion is output to a signal analyzer and the selected second portion is output, concurrently, to a data processor. *See* '008 Patent, claim 3. There is no written description support for this in the specification of the '008 Patent.

64. As I pointed out in my Opening Invalidity Report, the specification of the '008 Patent discloses that the monitoring device and data processing device are in a "parallel arrangement" and may "concurrently process[]" the signals they receive. '008 Patent at 4:7-10; 4:45-50; *see also id.* at 6:30-36. There is, however, no written description or enabling disclosure to support the concurrent ***outputting*** of the first and second portion of a signal, whether from a channelizer or any other component. Figure 4 demonstrates this point.



65. FIG. 4 depicts an example embodiment of a process for spectrum monitoring that, at step 410, conveys a first one or more channels (*i.e.*, a selected first portion) to the data processing module and, at step 412, conveys a second one or more channels (*i.e.*, a selected second portion) to the monitoring module. *See also id.* at 6:19-36 (description of FIG. 4). No other embodiment is disclosed and, certainly, no other embodiment that supports a method or system where steps 410 and 412 (which correspond to outputting the selected first and second portions of a digitized signal) can occur "concurrently."

ii. "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" (Claim 5)

66. As I discussed in my Opening Invalidity Report in connection with claim 8 of the '826 Patent, the common specification of the '008 and '826 Patents contain no disclosure of the measurement of "peak-to-average ratio," "noise levels," "bit error rate," or "symbol error rate." *See* Opening Invalidity Report, ¶ 356. As claim 5 recites these same characteristics, it is my opinion that the specification fails to provide written description support to enable the full scope of this claim.

IV. OBJECTIVE INDICIA OF NONOBVIOUSNESS

67. I understand that, on July 21, 2023, the same day that I submitted my Opening Invalidity Report, Entropic supplemented its responses to Charter's Interrogatory No. 15, setting forth its positions on objective indicia of nonobviousness ("secondary considerations") of the asserted claims of each asserted patent. I understand that Entropic was asked, in Interrogatory No. 15, to provide details of all objective indicia of nonobviousness, including long-felt need, failure of others, industry recognition, expression of skepticism or disbelief, unexpected results, copying, near-simultaneous invention, and commercial success. *See* Plaintiff Entropic Communications, LLC's Third Supplemental Responses to Defendant's First Set of Interrogatories to Plaintiff (Nos. 2, 3, 4, 15, and 16) ("Entropic Responses") at 41-44 (setting forth Entropic's First Supplemental Response to Interrogatory No. 15).

68. Having reserved my rights in my Opening Invalidity Report to respond to any additional evidence on objective indicia of nonobviousness submitted by Entropic subsequent to the preparation of my Opening Invalidity Report, I have reviewed Entropic's responses and the evidence Entropic cites and provide my opinions for each patent below.

69. I also understand that, on August 11, 2023, Entropic's invalidity experts Dr. Matthew Pooley, Dr. Richard Kramer, and Mr. John Holobinko submitted reports in rebuttal to my Opening Invalidity Report which set forth new opinions on secondary considerations. Accordingly, I reserve my rights to respond.

a. Applicable Legal Principles

70. I understand that determining whether an invention is obvious from the prior art can require more than merely analyzing the differences between the prior art and the claimed invention. There are also "secondary considerations" or "objective indicia" that assist in determining whether a patent was obvious in view of the prior art. I understand that these can include the commercial success of the invention; whether the prior art teaches away from the invention; a long-felt but unsatisfied need for the invention; copying of the invention by competitors; unsuccessful attempts by those skilled in the art to make the invention; skepticism or disbelief by those skilled in the art that the patentee's approach worked; and recognition of the invention's advancement. These are not exclusive factors, and not every factor is relevant to every patent. I further understand that each secondary consideration must have a nexus to the claimed invention in order for it to be relevant. For example, "commercial success" must occur because of something desirable about the nature of the invention itself, not because of a company's marketing and advertising efforts.

b. The '690 Patent

71. To support its assertion of industry recognition and commercial success of the alleged invention disclosed in the '690 Patent, Entropic cites documents published by CableLabs that describe Proactive Network Maintenance ("PNM"). I have reviewed these documents and, in my opinion, Entropic has failed to establish any nexus between the asserted claims of the '690 Patent and secondary considerations that involve the use of PNM.

72. First, Entropic makes no attempt, in its supplemental response, to read PNM on to the asserted claims. So, in my opinion, Entropic has failed at the outset to demonstrate that any supposed industry recognition and commercial success tied to PNM usage has anything to do with particular claim features.

73. PNM discloses various techniques for cable operators to proactively correct network impairments which are not related to the '690 Patent. *See, e.g.*, CHARTER_ENTROPIC00351497 at 351507. Among these techniques are various downstream measurements, such as downstream symbol capture, downstream wideband spectrum analysis, downstream NPR (noise power ratio) measurement, determination of downstream channel estimate coefficients, and downstream constellation display. *Id.* at 351520, 351525, 351553, 351559, 351565. On the upstream, PNM discloses techniques for the measurement of noise and FEC statistics. *Id.* at 351603, 351606. These are exemplary techniques that have nothing to do with probes, which is the subject matter that the claims of the '690 Patent are directed to. Entropic has not pointed to any evidence that cable industry participants have adopted or currently practice PNM techniques due to any feature of the asserted claims. Therefore, to the extent that adoption and practice of PNM can be considered an indication of industry praise or commercial success of techniques disclosed in PNM, such adoption and practice does not indicate praise and commercial success of any particular features claimed by the '690 Patent.

74. Entropic also fails to identify a specific product that uses PNM which embodies any claim of the '690 Patent, and for which Entropic's evidence demonstrates industry praise or commercial success resulting from any claimed feature. As I discussed above, the general adoption of PNM by cable industry participants can be completely unrelated to any claim features that are allegedly disclosed by PNM and Entropic has not pointed to any evidence that shows otherwise. In addition,

Entropic has stated that it is not aware of any products that it believes practice the asserted patents other than the products asserted against Charter in this case. *See* Entropic's First Supplemental Response to Interrogatory No. 14.

75. Accordingly, I have reviewed Entropic's Third Supplemental Infringement Contentions, where Entropic alleges certain "Spectrum Accused Services" of infringing the asserted claims, and identifies the Arris E6000, Casa C100G, and Cisco cBR8 CMTS's, as well as different models of the Spectrum PC20 cable modem. *See* Ex. B to Entropic's Third Supplemental Infringement Contentions at 2. Based on my review, there are several claim limitations that are not implicated by PNM, and for which Entropic has not cited as being practiced by PNM. For example, independent claim 1 requires "determining a second plurality of parameters associated with generation and transmission of the probe." PNM, however, discloses no such feature and Entropic does not cite anything in PNM for this feature. *Id.* at 7. Similarly, claim 9 requires the probe to be "generated in accordance with the first plurality of parameter and in accordance with a second plurality of parameters determined by the second node." *Id.* at 12. Again, PNM does not disclose the determination of a second plurality of parameters, as required by the claim. Therefore, in my opinion, Entropic's reliance on cable industry participants' adoption and practice of PNM as evidence of value ascribed by the industry to its claimed invention and of its commercial success is misplaced.

76. My opinion that the '690 Patent has little to no commercial value is further confirmed by the testimony of David Barr, the patent's sole inventor. For example, when asked if he had ever been asked to analyze whether any product embodies or infringes any claim of the patent, Mr. Barr confirmed that he had not been asked to do so. Barr Tr. at 52:5-8. Mr. Barr confirmed that he had attached no particular importance to the issuance of his own patent, which he did not remember.

Id. at 52:22-53:1; *see also id.* at 53:18-54:1 (confirming he did not save or keep a memento awarded by Entropic for issuance of the '690 Patent). Mr. Barr could not even recall the "eureka moment" that led to his invention, which is a further indication of the low value of '690 Patent. *Id.* at 54:25-55:2.

77. I also understand that Charter contends that it does not infringe any of the asserted claims of the '690 Patent. Therefore, because Entropic only identifies the Spectrum Accused Services as allegedly practicing the asserted claims of the '690 Patent, should there be a finding of no infringement of these claims, it follows that there cannot be a nexus between any secondary consideration and the asserted claims.

c. The '362 Patent, the '008 Patent, and the '826 Patent

78. I have reviewed the deposition testimony of Curtis Ling, a co-inventor of the '362 Patent, who, I understand, is a senior executive at MaxLinear, Inc. Entropic cites portions of that testimony in which Dr. Ling states that there was skepticism regarding whether MaxLinear could mass-produce products that performed as MaxLinear said they would. That skepticism, however, does not have a nexus corresponding to the asserted claims, and Entropic does not attempt to show how the features discussed by Dr. Ling embody any asserted claim.

79. Based on my review of Dr. Ling's testimony, the skepticism he encountered related to manufacturing techniques is neither claimed nor described in any of the asserted patents. *See* Ling Tr. at 101:19-102:8 ("And by 'forms,' I mean standard, mass production CMOS semiconductor processes").

80. Entropic also relies on documents from CableLabs that describe PNM "best practices" as demonstrating "the value of these patents." Entropic Responses at 41.

81. First, Entropic's supplemental response to Interrogatory No. 15 fails to map any allegedly beneficial aspect of PNM to any claim or limitation of the '362, '008, and '826 Patents. I have also

reviewed Entropic's operative infringement contentions for each of the '362, '008, and '826 Patents and none of them identify any correspondence between PNM and the asserted claims of these patents. As such, in my opinion, this indicates that Entropic is not able to identify a connection between the benefits associated with adoption of PNM and the claims of the '362, '008, and '826 Patents.

82. A product that adopts the practices described in PNM does not, per se, embody the claims of the '362, '008, and '826 Patents. For example, the '362 Patent claims a method carried out in a wideband receiver system, which includes the steps of downconverting a signal by a mixer module, digitizing the downconverted signal, selecting desired channels from the digitized signal, and outputting those selected channels to a demodulator. '362 Patent at 12:37-53. PNM, however, does not relate to the architecture of a wideband receiver. Although PNM contains a high-level description of full-band capture (*see, e.g.*, CHARTER_ENTROPIC00103988 at 104085-104086), as I discussed in my Opening Invalidity Report, the '362 Patent does not relate to full-band capture, but, rather, as its title indicates, a wideband tuner. Opening Invalidity Report, ¶ 479. Entropic, additionally, does not attempt to identify any features within PNM that correspond to any limitation of the asserted claims of the '362 Patent. Any value that can be inferred from the use of PNM is therefore not linked to the supposed value of the '362 Patent.

83. With regard to the '008 and '826 Patents, the asserted independent claims (1 and 3) of the '008 Patent involve the receiving and digitizing of a signal, the selection of first and second portions of the digitized signal, and ***concurrently*** outputting the selected first portion to a signal monitor (or, in the case of claim 3, a signal analyzer) and the selected second portion to a data processor. '008 Patent, claims 1, 3. Although PNM likens full-band capture to "having a spectrum analyzer in every home," CHARTER_ENTROPIC00103988 at 104085, PNM does not involve

the ***concurrent*** output of a first portion of a digital signal to be analyzed by a signal monitor or analyzer and the output of a second portion of that digital signal to a data processor that recovers content from the second portion.

84. Independent claim 1 of the '826 Patent requires "controlling the transmission of network management messages back to [the] headend based on [a] measured characteristic … wherein [the] measured characteristic is different than [the] network management message. '826 Patent, claim 1. I understand that the Court construed "network management message" to mean "messages which report on the network based on the measured characteristics." CC Order at 62. As such, I note that PNM's disclosure for capturing spectrum information does not involve the transmission of messages that report on the network back to the headend, as required by claim 1. Rather, full-band capture, as disclosed in PNM, provides for the display of the magnitude (or power) of the signal at different frequencies (i.e., the display of measured characteristics), not transmission of messages that are different from measured characteristics. *See, e.g.*, CHARTER_ENTROPIC00103988 at 104086-10490 (depicting "examples of FBC screen shots as 'seen' at the cable modem. The horizontal axis in each figure is frequency in MHz, and the vertical axis is in dB").

85. As I discussed with respect to the '690 Patent, PNM describes various practices that are not directly related to the features of the asserted claims of the '362, '008, and '826 Patents. These include, for example, downstream symbol capture, downstream NPR measurement, the determination of downstream channel estimate coefficients, and downstream constellation display. Therefore, the adoption of PNM techniques by a cable provider is not indicative of the value of these patents.

86. Entropic also relies on a presentation given by Broadcom to Charter, as well as Broadcom product documentation for the BCM3383 and BCM3384 System-on-Chips (SoCs) which tout the benefits of full-band capture and refer to full band capture as a "breakthrough technology." *See, e.g.*, BRCM-22cv00125_00000011 at 17. As I discussed above, in my opinion, none of the asserted claims of the '362 Patent cover full-band capture, and there is, therefore, no nexus. The '362 Patent is directed to a "*Wideband* Tuner Architecture," not *full-band* capture. As I explained in my Opening Invalidity Report, the '362 Patent teaches away from a system that digitizes and entire incoming RF signal as is, which is what a full-band capture system would do. Opening Invalidity Report, ¶ 479. As I further explained, co-inventors (Reddy and Gallagher) of the '362 Patent confirmed that their invention was not directed to digitization of the entire incoming spectrum. *Id.* ¶¶ 480-481.

87. As shown by the BCM3384 DOCSIS 3.0 SoC Preliminary Technical Information (BRCM-22cv00125_00000011) and the BCM3383 Product Features (BRCM-22cv00125_00000002), the BCM3384 and BCM3383 SoCs do not embody the asserted claims of the '008 or '826 Patents. For example, as discussed above, asserted independent claims 1 and 3 of the '008 Patent require the concurrent output of selected first and second portions of a digital signal to signal monitor (or analyzer) and to a data processor, and claim 1 of the '826 Patent requires the controlling of transmission of network management messages back to the headend. Neither the BCM3384 nor the BCM3383 SoC includes these features. Thus, in my opinion, any commercial success or value attributed to the BCM3383 or BCM3384, or devices that implement these SoCs, lack a nexus to the claims of the '008 and '826 Patents.

88. The testimony of Jun Huang, one of the co-inventors of the '008 and '826 Patents, supports my view that these patents are of limited value. Indeed, when asked if he had an understanding of

what made the concepts of the patent inventive, Mr. Huang stated that he didn't have such an understanding and that he didn't "necessarily know all the details." Huang Tr. at 24:4-9. In fact, Mr. Huang did not even remember ever seeing the '826 Patent at all. *Id.* at 23:12-14.

89. In addition, Dr. Ling, a co-inventor of the '362 Patent, as well as the '682 Patent, was asked whether he was aware of any analysis performed by MaxLinear to confirm whether MaxLinear chips embody elements of the asserted patents in this case, or any related patents. Ling Tr. at 47:13-16. Dr. Ling replied: "We do not have or -- and did not perform any analysis of the MaxLinear chips and whether they embodied the claim elements and the claims of the – of the patents-in-suit." *Id.* at 47:17-20. Dr. Ling also confirmed that MaxLinear has not marked any of its products with patent numbers, stating that "MaxLinear deemed it impractical to mark its products with the patents that those products would embody because, as you may understand, chips and SoCs are quite small and such a marking would involve probably more than one patent, but even one patent would be rendered illegible by the size of the marking. So, after consultation, we decided not to." *Id.* at 57:5-14.

90. I also understand that Charter contends that it does not infringe any of the asserted claims of the '362, '008, and '826 Patents. Therefore, because Entropic only contends that the accused products in this case allegedly practice the asserted claims of the '362, '008, and '826 Patents, should there be a finding of no infringement of these patents, it follows that there cannot be a nexus between any secondary consideration and the asserted claims.

d. The '682 Patent

91. With respect to the '682 Patent, Entropic relies on the Profile Management Application system (or PMA) as allegedly demonstrating the commercial success of the '682 Patent. I have reviewed the evidence that Entropic cites and, in my opinion, Entropic has again failed to establish

a nexus between the alleged invention claimed in the '682 Patent and any financial benefits, commercial success, or unexpected results provided by PMA.

92. First, I note that the asserted claims of the '682 Patent are required to be performed by a ***CMTS.*** PMA, however, does not run on a CMTS, but, rather, on a server that is remote from the CMTS. *See, e.g.*, Entropic's Second Supplemental Infringement Contentions, Ex. F, at 3 (showing diagram depicting PMA functionality occurring outside of the CMTS), 4 (referring to the "Charter PMA system" as another server "that communicate[s] with CMs via the CMTS"). Accordingly, for this reason alone, there can be no nexus between any commercial success or other secondary consideration arising from PMA and any asserted claim because PMA does not embody the claims.

93. The evidence relied on by Entropic does not tie the alleged commercial success of PMA to the claimed features of the '682 Patent. Entropic relies on the testimony of Charter's Roger Stafford, who testified to reviewing a paper authored by Comcast personnel, entitled "Full Scale Deployment of PMA." *See* Entropic Responses at 42-43; Stafford Tr. at 147:15-22; CHARTER_ENTROPIC00216348. Entropic also relies on Stafford's reports and notes on his attendance at the Fall 2020 SCTE Cable-Tec conference and his meeting there with Comcast PMA developers as evidence of Charter's placing a high value on PMA.

94. This evidence of PMA's supposed value, however, is not tied in any way to the asserted claims of the '682 Patent. For example, Stafford, in his trip report, states that he learned in his meeting with Comcast that "PMA increases their [Comcast's] upstream throughput by 3-4 times in downstream peak speeds and 2 times in the upstream, partly due to the quietness of the new upstream spectrum above 40MHz." CHARTER_ENTROPIC00215485. Quietness of the upstream spectrum is not recited in any of the asserted claims of the '682 Patent. Further, Stafford notes that "[a] key point is that Comcast moved away from standards-based SNMP MIBs for data collection

and developed their own streaming telemetry protocols, direct from CM's, nodes, amplifiers and CMTS, to gain efficiencies in both the amount and periodic polls of data from these devices." *Id.* Efficient polling techniques has nothing to do with the '682 Patent and is not recited in any of the claims. Additionally, according to Stafford, "[t]hey [Comcast] rely on asymmetrical traffic where upstream is low, for FDX [full duplex] to work well." *Id.* This implies that the discussions between Stafford and Comcast related to claimed improvements to PMA which are not in any way tied to the asserted claims.

95. Stafford, upon his return from the conference, also reported to his colleagues that he received an "overview from Comcast on their mature downstream PMA solution and the new work they are doing on upstream PMA." CHARTER_ENTROPIC00184343. Stafford touted Comcast's "[v]ery advanced dashboarding of network metrics." *Id.* To the extent these observations are an indication of some PMA commercial success, they are, in my opinion, disconnected from any of the claimed features of the '682 Patent and do not demonstrate commercial success associated with the patent.

96. Entropic also cites an assortment of papers on PMA that were presented at various SCTE conferences as demonstrating (completely unidentified) "secondary consideration of non-obviousness of the patented technology related to PMA." *See* CHARTER_ENTROPIC00186339; CHARTER_ENTROPIC00213907; CHARTER_ENTROPIC00213927; CHARTER_ENTROPIC00213931; CHARTER_ENTROPIC00214820; CHARTER_ENTROPIC00216348.

97. Entropic has not identified what secondary considerations these papers on PMA demonstrate. Entropic did not attempt to tie to any of the asserted claims to anything that these papers disclose as being valuable features of PMA. I have reviewed these papers and note that

none of them cite features of PMA that Entropic alleges are infringing. For example, there is no mention in these documents of a "KMeans Classifier" which Entropic alleges infringes the limitation "generating … a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups." Entropic's 2nd Supplemental Infringement Contentions, Ex. F, at 8-9. At most, these documents indicate that there is active research going on in the field of PMA. These documents do not, however, indicate that any value in PMA is tied to any of the asserted claims.

98. Entropic also maintains that the "'682 Patent enables PMA and operation [sic] in the roll off region," allegedly demonstrating an unexpected result and commercial success. To support its allegation, Entropic relies on calculations performed by Charter demonstrating that deploying PMA in the roll off region "will increase average revenue per SG [service group] and enhance operational efficiencies." CHARTER_ENTROPIC00216387 at 216391. I understand that the "roll off region" is "created by deploying 1.2 GHz high split networks and upgrading active devices only such as nodes and amplifiers while not upgrading passive devices such as taps." *Id.* at 216390.

99. In my opinion, whether to deploy PMA in the roll of region from 1 GHz to 1.2 GHz (*id.* at 216388) is an implementation decision that is not tied to any of the claims of the '682 Patent, and, as a result, does not reflect any commercial success that stems from any claimed features. The claims of the '682 Patent do not recite any requirement that relates to where on the frequency spectrum that the techniques of the '682 Patent should be implemented.

100. I note that the documents that Entropic relies on do not indicate that PMA, by itself, is sufficient for operation in the roll-off region. For example, a presentation provided by Charter at the 2022 Cable-Tec Expo 22 conference states "PMA alone does not allow operation in the roll-off region. We must use a combination of optimized OFDM settings to get as many CMs online

as possible before PMA is implemented." CHARTER_ENTROPIC00216592 at 216610. *See also id.* at 216612 ("should an operator decide to operate OFDM in roll-off regions, the OFDM carrier should be configured/optimized first to ensure the best possible performance prior to PMA implementation"). In my opinion, this undermines Entropic's argument regarding the supposed advantages of PMA.

101. In addition, the limited testimony provided by inventors of the '682 Patent reinforces my belief that the patent is not very innovative and, hence, not very valuable. For example, co-inventor Timothy Gallagher, when asked about his involvement with the invention of the '682 Patent replied that "I don't really remember, to be honest with you, what specifically I contributed here." Gallagher Tr. at 50:8-14. Co-inventor Sridhar Ramesh was similarly uncertain about his contribution to the concepts described in the '682 Patent. *See* Ramesh Tr. at 20:5-11. In my opinion, if the '682 Patent has significant value, the named inventors would have a clear recollection as to their own contributions to the invention.

102. It is my opinion that, whatever value PMA has, the evidence of record does not demonstrate that such value is tied to any aspect of the claims. I also understand that Charter contends that it does not infringe any of the asserted claims of the '682 Patent. Therefore, because Entropic only contends that the accused products in this case allegedly practice the asserted claims of the '682 Patent, should there be a finding of no infringement of this patent, it follows that there cannot be a nexus between any secondary considerations and the asserted claims.

e. The '775 Patent

103. Entropic claims that "[e]vidence of the commercial success of the '775 Patent is demonstrated by the fact that Charter's 1GPS [sic] modems require the use of the technology found in the '775 Patent." Entropic Responses at 43. Entropic further states that "Entropic incorporates the testimony of Mr. Farhat and the discussion related thereto in the Expert report of Dr. Kramer."

Id. It then cites over two dozen documents without explaining their relevance. As set forth in its Response to Interrogatory 15, Entropic does not argue that there are any other indicia of nonobviousness for the '775 Patent apart from commercial success.

104. Dr. Kramer's report does not claim that the '775 Patent was commercially successful. The closest statement he makes that the '775 Patent is commercially successful is that "the '775 Patent is valuable to deploy and use to provide the most stable, highest quality data flows" and that it represents "a significant architectural advance." Kramer Opening Report ¶¶ 83-84. Dr. Kramer, however, does not point to how this purported value is actually reflected in the marketplace.

105. For example, Dr. Kramer does not claim that customers bought "Charter's 1GPS [sic] modems" ***because*** of the invention in the '775 Patent. Dr. Kramer also does not testify that Charter's sales of this modem were better than any other modem on the market. This assertion accordingly lacks a nexus between the purported invention of the '775 Patent to whatever commercial success Charter may have derived from this particular cable modem.

106. Similarly, Entropic provides no explanation as to the relevance of the documents to which it cites in response to Charter's Interrogatory No. 15 beyond asserting that these documents are relevant. I am unable to determine how or why these documents are relevant to the commercial success of the Charter's modems. For example:

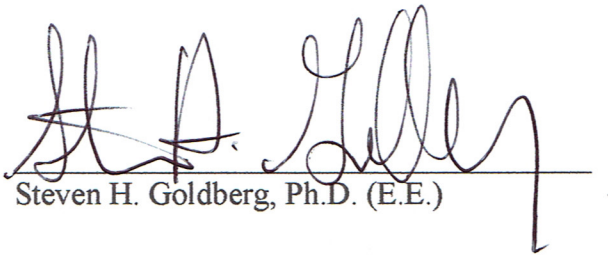
> CHARTER_ENTROPIC00097617 reflects Charter's efforts to implement the DOCSIS 3.1 standard in its cable modems. The document does not reference why Charter's products are successful—or even that they are successful.
>
> CHARTER_ENTROPIC00124915 reflects Charter's efforts to implement the DOCSIS 3.1 standard without any reference to the commercial success of modems that implement this standard.
>
> CHARTER_ENTROPIC00219123 is just an advertisement for Charter's home telecom services. It contains no indication of how this advertisement is tied to the commercial success of Charter's cable modems, nor does Entropic explain how this document provides evidence as to whether the '775 Patent was commercially successful.

107. Finally, Entropic incorporates the testimony of Mr. Farhat. Mr. Farhat's testimony is simply not relevant to the issue of commercial success. Mr. Farhat is a senior director of software engineering at Broadcom and manages "engineering folks who are involved in the software design of [Broadcom's] cable modem chipsets." Farhat Tr. ta 15:13-23. His deposition testimony contains no mention of whether or not these chips are commercially successful—specifically, he does not reference anything relating to the sales of these chips.

V. CONCLUSION

108. For at least the reasons stated herein and in my opening expert report, served on July 21, 2023, each and every patent asserted against Charter in this litigation is invalid. I reserve the right to respond to any evidence (including expert opinions) that Entropic may offer in response to my opinions.

Dated: August 14, 2023



Steven H. Goldberg, Ph.D. (E.E.)